

CLEARPOINT





DCME-576

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If my memory serves me right. . . It must be Clearpoint®.

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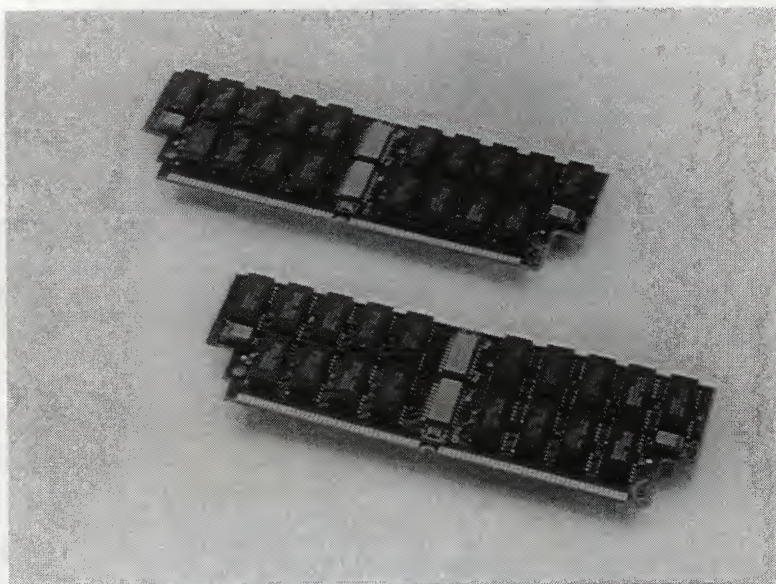
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The Clearpoint DCME-576



Chapter 1 Overview

1.1 Manual Overview

This manual is written for the individual with basic computer knowledge and some technical experience. Read these instructions carefully before proceeding. If you have no technical background and no qualified person is available, call Clearpoint's Product Support line 1-800-332-CLPT(2578) and request assistance.

— STATIC DISCHARGE WARNING —

All Clearpoint products are exhaustively tested prior to shipment to insure superior field performance. Failures in the field are largely attributed to component failure due to improper handling. Be sure to take all necessary precautions during installation, particularly for grounding to protect against ESD (electrostatic discharge) damage.

This manual covers:

- The procedure for installing the DCME-576 series of RAM modules in the VAXstation 3100 Model 76 and the diagnostic software tests for confirming computer recognition of the new RAM configuration (Chapter 2).
- The procedure for installing the DCME-576 series of RAM modules in the DECsystem 5100 and the diagnostic software tests for confirming computer recognition of the new RAM configuration (Chapter 3).
- Additional systems that work with the DCME-576 memory boards (see page 1-2).
- The steps to take if you have any difficulty (Chapter 4).

1.2 Product Features

Clearpoint's DCME-576 memory boards provide random access memory for the MicroVAX 3100 Models 30, 40, and 80; VAXstation 3100 Model 76; VAXstation 4000 Model 60; and DECsystem 5100.

The DCME-576 provides the following features:

- Maximum memory capacities:

VAXstation 3100 Model 76	32 MB
MicroVAX 3100 Model 30, 40	32 MB
pairs of 4 MB modules only	
MicroVAX 3100 Model 80	72 MB
DECsystem 5100	128 MB
VAXstation 4000 Model 60	104 MB
pairs of 4 MB and/or 16 MB modules	

- Memory Read/Write Cycles:

4 MB	160 ns
16 MB	150 ns

INSTALLATION NOTE:

In the **MicroVAX 3100**, modules are installed in pairs, in side-by-side slots. In the **Models 30 and 40**, up to six 4 MB DCME-576 SIMMs can be installed, with 8 MB soldered on the CPU board, for a maximum of 32 MB. **In the Model 80, two 4 MB DEC modules are standard in the first two slots, and MUST remain there.** Two or four additional 4 or 16 MB DCME-576 SIMMs can be installed in the remaining slots, for a maximum of 72 MB.

1.3 Physical Description

The DCME-576 memory boards are populated with 1 Mb or 4 Mb SOJ (fast page mode) DRAM chips. The boards measure 5.35" x 1.7" and are dual-sided for maximum density configurations.

Power Requirement (amps)

	32 MB (2 x 16 MB)	8 MB (2 x 4 MB)	4 MB
Max. Operating	6.8	5.0	2.5
Max. Standby	0.14	0.14	0.072

Operating Temperature0° to 70° C (32° to 158° F)

Storage Temperature-50° to 125° C (-40° to 257° F)

Humidity0 - 90%, non-condensing

Chapter 2

Installation & Verification

VAXstation 3100 Model 76

2.1 Chapter Overview

Chapter 2 describes the installation of Clearpoint DCME-576/4MB memory modules in the VAXstation 3100 Models 76; up to eight modules may be installed, for a system maximum of 32 MB. The chapter also includes procedures for verifying the computer's recognition of the new memory configuration.

— Static Discharge Warning —

It is important that you protect the memory boards from static discharge. An undetected static charge can damage a board and cause apparent system failure and data corruption. Be sure to be properly grounded before handling any memory board.

2.2 Preparation for Installation – Inspection

1. Before removing the memory module from the protective antistatic bag, be sure that you are grounded by using the enclosed wrist strap. Directions for the proper use of the wrist strap are on the wrist strap envelope.
2. Once you are properly grounded, remove the memory module from the antistatic bag and carefully examine it for any damage (bent corners, loose chips, etc.). If you notice any visible damage, call Clearpoint's Product Support Engineering immediately. (See Chapter 4 for details about calling Clearpoint's Product Support Engineering.)
3. Copy the revision code from each board onto the form in Chapter 4 of this manual. This information is required for any repairs or replacements.
4. Return each module to its antistatic bag until you are ready for the installation.

2.3 Hardware Installation – VAXstation 3100 Model 76

Note:

If your system has internal hard disk drives, be sure to follow the manufacturer's instructions to secure the hard disk read/write heads before you move the drives.

1. **Shut down the system before you turn off the power to the unit.** Refer to your VAXstation 3100 operating systems documentation for shutdown instructions before turning your system off. When the shutdown sequence ends, turn off the power switch on the back panel of the unit.
2. **Remove the power cord and data cables from the rear of the unit.** Make a note of the connection locations before removing the cables.

WARNING:

Clearpoint recommends that you detach the power cord from the system unit and use an appropriate wrist-strap, heel-strap, or a similar method for static protection. While keeping the power cord attached to the unit during installation provides an electrical ground via the wall outlet for static protection, it also creates the danger of inadvertent high-voltage contact for the installer.

3. **Remove the unit cover.** Loosen the Phillips head screws on the lower left and the lower right side of the back panel. Refer to Figure 2-1. Slide the cover toward the front of the unit and then lift to remove it.

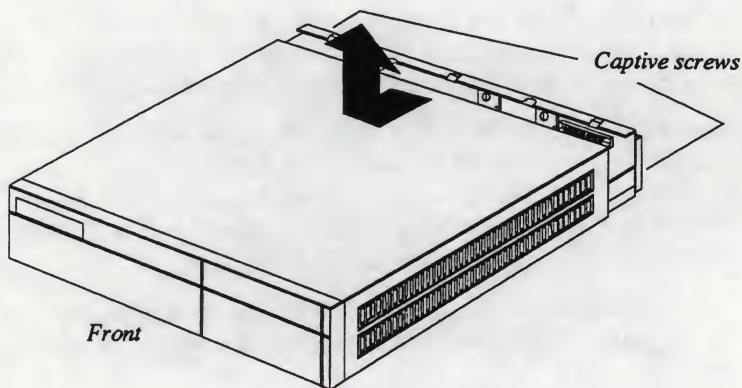


Figure 2-1: Removing the Computer Cover

4. Remove the disk drive mounting panel.

- a. Loosen the five, spring-loaded captive screws that secure the disk drive mount panel to the unit (see Figure 2-2).
- b. In addition to the captive screws, there are three Phillips head slide mount screws along the right side of the drive mount panel. Loosen but do not remove these three screws – they prevent the drive mount panel from falling onto the system board.

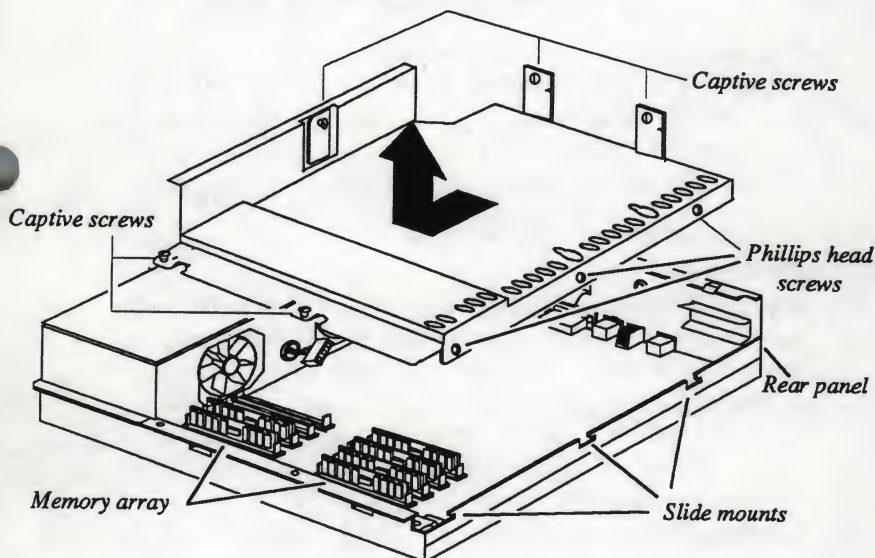


Figure 2-2: Removing the Drive Mount Panel

- c. Slide the panel forward to release the Phillips head screws from the slide mounts and then lift the plate from the chassis. You may need to disconnect the hard drive internal power and/or SCSI cables before you can maneuver the mounting panel. For the sake of clarity, these internal power cables and SCSI cables are not shown in Figure 2-2.

5. Determine the module configuration.

The two memory module arrays are located along the front side of the system board (refer to Figure 2-2 above). The module slots are numbered from 1 through 8, and the number is printed on the system board next to each slot (see Figure 2-3 on the next page).

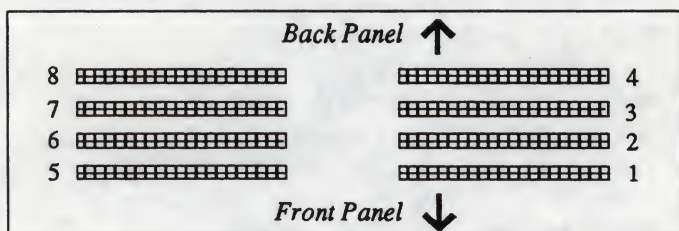


Figure 2-3: Memory Module Slot Numbers

You may install modules in any order of density, but observe the following restrictions when you determine the new memory configuration:

- Modules must be installed in slots 1 and 2 for all the memory to be recognized successfully.
- No empty slots should exist between consecutive modules.

6. Replace and/or install the modules.

To remove an installed module:

If you are replacing currently installed modules, use the following method to remove them from the system board. Take special care not to damage the connector, the retaining latches, or the module.

- a. Simultaneously push outward with your thumbs on the retaining latches located at each side of the module connector. The module should spring outward far enough to bring the edge of the module past the retaining latches (Figure 2-4).
- b. Maintain the module's angle and pull the module from the slot.
- c. Store the module in an antistatic bag.

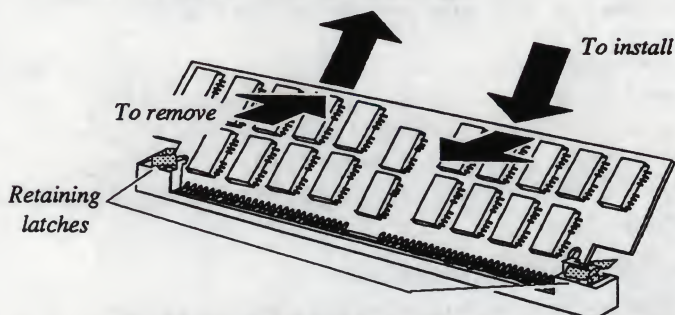


Figure 2-4: Module Installation in a VAXstation 3100

To install DCME-576 modules:

- a. Remove a module from the antistatic bag.
- b. Hold the module at a 60 degree angle, with the gold fingers at the bottom and the Clearpoint logo facing you (the side with the double notch should be toward the power supply/fan housing).

- c. Insert the gold fingers into the module socket and tip the module to a vertical position; it locks into place with a "click" (Figure 2-4).

A module is seated properly when it cannot be moved by hand and is even with the other installed memory modules. If the module is not seated correctly, *do not push on it*; remove it and then re-install it.

7. Re-assemble the unit.

- a. Reconnect any disk drive power or data cables that you may have disconnected when you removed the drive mounting panel.
- b. Replace the drive mounting panel on the chassis by aligning the three Phillips head screws with the slots along the right edge of the chassis and sliding the plate toward the rear of the unit.
- c. Tighten the three Phillips head screws and the five captive screws.

8. Replace the unit's cover and reconnect the system power cord.

- a. Place the cover over the chassis, leaving about an inch of space between the rear edge of the cover and the rear panel of the chassis. Slide the cover forward carefully to engage the cover locking tabs that extend along the top rear and lower front width of the chassis.
- b. Tighten the captive Phillips head screw at each side of the rear panel.

2.4 Power-up Diagnostic Test – VAXstation 3100

After the DCME-576 modules have been installed, turn on the power switch located on the rear panel. As the system performs its power-up diagnostic tests, a row of code numbers is displayed, followed by lines of data that summarize the test results. The memory check values are listed near the middle of the screen and appear similar to Figure 2-5 below.

```
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
KA43-A V1.0
ID 08-00-2b-07-05-02
```

```
...
MEM          0020.0001
02000000
```

```
...
>>>
```

RAM size in hexadecimal code
Hexadecimal memory size (32 MB)

Figure 2-5: VAXstation 3100 Model 76 Power-up Display

The amount of RAM that the power-up diagnostic test identifies is displayed in hexadecimal code to the right of **MEM** on the memory data line. The total amount of memory recognized is also given in hexadecimal format on the next line (see Figure 2-5 above). Table 2-1 on the next page provides the memory size equivalents for the hexadecimal code displayed.

Memory Size	Hexadecimal Code	Memory Size	Hexadecimal Code
4 MB -----	0004.0001	20 MB -----	0014.0001
8 MB -----	0008.0001	24 MB -----	0018.0001
12 MB -----	000C.0001	28 MB -----	001C.0001
16 MB -----	0010.0001	32 MB -----	0020.0001

Table 2-1: Hexadecimal Codes for VAXstation 3100 RAM Configurations

When the power-up test detects unusable memory, a bit map representation of the failing module's location is also displayed. The bit map is listed on the same line as the hexadecimal memory size (see Figure 2-6 below).

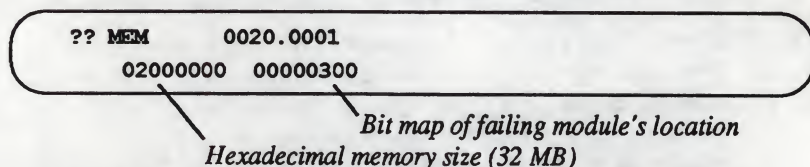


Figure 2-6: VAXstation 3100 Model 76 Memory Error Display

If a memory failure is detected, the position of the non-zero digit in the bit map indicates the memory modules location according to Table 2-2 below. For example, the bit map, 00000300, shown in Figure 2-6 indicates that the module located in slot 3 on the CPU has failed.

Module Location Etched on the CPU*	8-Digit Bit Map Error Code
1	0 0 0 0 0 0 0 X
2	0 0 0 0 0 0 X 0
3	0 0 0 0 0 X 0 0
4	0 0 0 0 X 0 0 0
5	0 0 0 X 0 0 0 0
6	0 0 X 0 0 0 0 0
7	0 X 0 0 0 0 0 0
8	X 0 0 0 0 0 0 0

* Refer to Figure 2-3 on page 2-4 for the numbering sequence on the CPU.

If $X \neq 0$, the location of X determines the location of the failing module.

Table 2-2: Interpreting the Bit Map Memory Error Code

If the values displayed indicate a lack of complete memory recognition, do the following:

- Make note of the values shown.
- Repeat the installation procedures and precautions given earlier in this chapter and check that each module is seated correctly in its socket. An easy way to check this is to sight along the tops of the installed modules; all the tops should be at the same level. If one is higher than the rest, *do not push on it*, remove it and then re-install it.
- Check the arrangement of the modules in the array. Refer to the module configuration restrictions given on page 2-4.
- Re-assemble and repower the system.
- Compare the current values of the power-up test with the previous values.
- If a problem is still evident, contact Clearpoint's Product Support for assistance (refer to Chapter 4).

Chapter 3

Installation & Verification

DECsystem 5100

3.1 Chapter Overview

Chapter 3 describes the installation of the Clearpoint DCME-576/8MB and DCME-576/32MB memory board sets in the DECsystem 5100. Each set consists of a pair of memory boards of the same density (either 4 MB or 16 MB); a mixed configuration of sets may be installed, up to a system maximum of 128 MB. The chapter also includes procedures for verifying memory recognition by the computer.

— Static Discharge Warning —

It is important that you protect the memory boards from static discharge. An undetected static charge can damage a board and cause apparent system failure and data corruption. Be sure to be properly grounded before handling any memory board.

3.2 Preparation for Installation – Inspection

1. Before removing the memory module from the protective antistatic bag, be sure that you are grounded by using the enclosed wrist strap. Directions for the proper use of the wrist strap are on the wrist strap envelope.
2. Once you are properly grounded, remove the memory module from the antistatic bag and carefully examine it for any damage (bent corners, loose chips, etc.). If you notice any visible damage, call Clearpoint's Product Support Engineering immediately. (See Chapter 4 for details about calling Clearpoint's Product Support Engineering.)
3. Copy the DCME-576 revision code from each board onto the form in Chapter 4 of this manual. This information is required for any repairs or replacements.
4. Return each module to its antistatic bag until you are ready for the installation.

3.3 Hardware Installation – DECsystem 5100

Note:

If your system has internal hard disk drives, be sure to follow the manufacturer's instructions to secure the hard disk read/write heads before you move the drives.

1. **Shut down the system before you turn off the power to the unit.** Refer to your DECsystem 5100 operating systems documentation for shutdown instructions before turning your system off. When the shutdown sequence ends, turn off the power switch on the back panel of the unit.
2. **Remove the power cord and data cables from the rear of the unit.** Make a note of the connection locations before removing the cables.

WARNING:

Clearpoint recommends that you detach the power cord from the system unit and use an appropriate wrist-strap, heel-strap, or a similar method for static protection. While keeping the power cord attached to the unit during installation provides an electrical ground via the wall outlet for static protection, it also creates the danger of inadvertent high-voltage contact for the installer.

3. **Remove the unit cover.** Loosen the Phillips head screws on the lower left and the lower right side of the back panel (see Figure 3-1). Slide the cover toward the front of the unit and then lift to remove it.

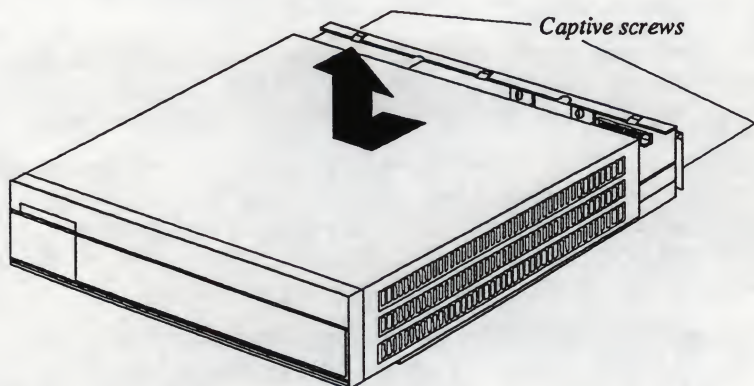


Figure 3-1: Removing the Computer Cover

4. Remove the upper disk drive mounting plate.

Loosen the four spring-loaded captive screws that secure the upper, disk drive mounting plate to the chassis and to the lower drive mounting plate (see Figure 3-2).

You may rest the upper mounting plate, with the hard drives still attached, on the power supply/fan housing. However, you may need to disconnect one or more of the hard drive internal power and/or SCSI cables in order to maneuver the upper mounting plate. For clarity, these power and SCSI cables are not shown in Figure 3-2.

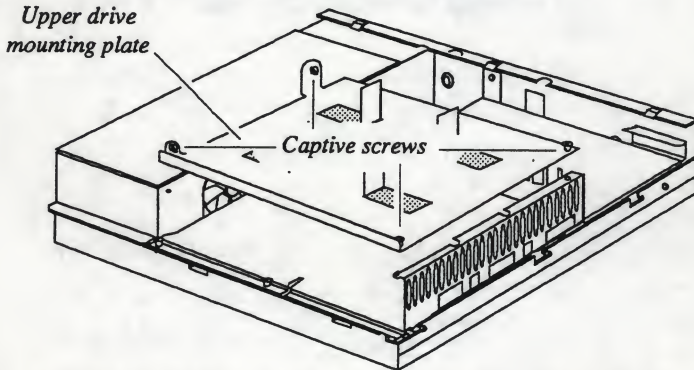


Figure 3-2: Removing the Upper Disk Drive Mounting Plate

5. Remove the lower hard disk mounting panel.

The lower mounting panel is secured by seven (7) screws. Three are Phillips head screws located along the lower right side of the panel; the other four screws are captive screws that attach the lower mounting plate to the front panel of the chassis, to the fan/power supply housing, and to the rear panel of the unit (refer to Figure 3-3).

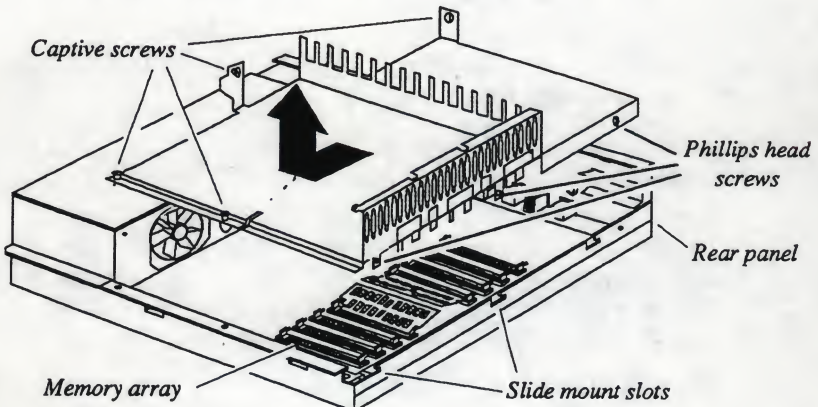


Figure 3-3: Removing the Lower Disk Drive Mounting Plate

- a. Loosen the three Phillips head screws, but remove only the rear screw; the other two screws are slide mount screws that prevent the right side of the panel from dropping onto the CPU board.
- b. Loosen the five captive screws.
- c. Slide the lower mounting panel forward to release the slide mount screws and then lift the panel from the chassis.

6. Determine the module configuration.

Two memory module arrays are located on the right side of the system board (see Figure 3-3). *The bank number is printed on the system board next to each module slot (see Figure 3-4).*

The following restrictions apply to installing memory modules:

- No empty banks should exist between consecutive modules.
- Modules must be replaced and/or added in pairs of identical densities.
- One module of each pair must be installed in the same numbered bank in each of the two arrays.
- 16 MB memory modules must be installed in lower numbered banks than 4 MB modules.

For example: If you are installing two 16 MB modules in a system that already had four 4 MB modules installed in Bank 0 and Bank 1, you must remove the 4 MB modules from Bank 0 and Bank 1 and install the two 16 MB modules in Bank 0. You would then re-install the four 4 MB modules in Bank 1 and Bank 2.

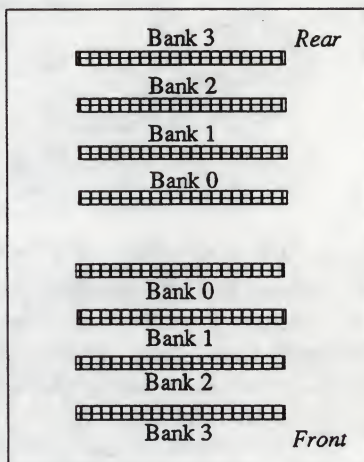


Figure 3-4:
CPU Module Bank Arrays

7. Replace and/or install the memory modules.

To remove an installed module:

- a. Simultaneously push outward with your thumbs on the retaining latches located at each side of the module connector (see Figure 3-5 at the top of the next page). The module should spring upward far enough to bring the edge of the module past the retaining latches.
- b. Maintain the module's angle and pull the module from the slot.
- c. Store the module in an antistatic bag.

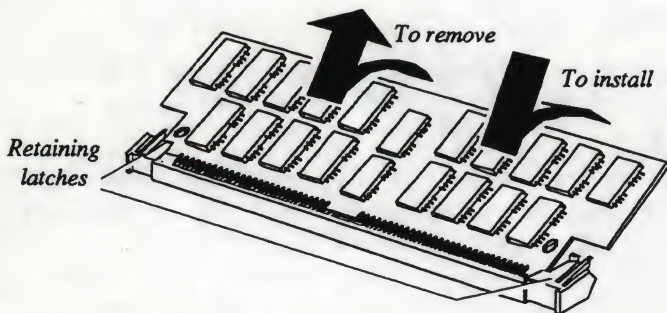


Figure 3-5: Module Installation in a DECsystem 5100

To install DCME-576 modules:

- a. Remove a module from its antistatic bag.
- b. Hold the module at a 60 degree angle, with the gold fingers at the bottom and the Clearpoint logo facing upward – the bottom corner cutout should be on the power supply side for front array banks and on the side away from the power supply for the rear array banks.
- c. Insert the gold fingers into the connector and tip the module backward. The module locks into place with a “click” (Figure 3-5).

A module is seated properly when it cannot be moved by hand and its top edge is even with the other installed memory modules. If the module is not seated correctly, *do not push on it*; remove it and then re-install it.

8. Re-assemble the unit.

- a. Replace the lower drive mounting panel on the unit by aligning the two Phillips head screws with the slide mount slots along the right edge of the chassis. Slide the plate toward the rear of the unit. Replace the third Phillips head screw and tighten the three Phillips head screws and the four captive screws.
- b. Reconnect any disk drive internal power or SCSI cables that you may have removed earlier.
- c. Align and tighten the four captive screws that attach the upper disk drive mounting panel to the lower disk drive mounting panel.

9. Replace the unit cover.

- a. Align the cover over the unit, leaving about an inch of space between the rear edge of the cover and the rear panel of the unit. Slide the cover forward carefully to engage the cover locking tabs that extend along the top rear and lower front width of the chassis.
- b. Tighten the two captive Phillips head screws on each side of the rear panel.

3.4 Power-up Diagnostic Test – DECsystem 5100

The following procedure for confirming the RAM configuration in the DECsystem 5100 assumes that the DCME-576 modules have been installed and that the system is re-assembled and powered off.

Turn on the power switch located on the rear panel. As the system performs its power-up diagnostic tests, it displays two rows of code numbers and then three lines of data; the screen looks similar to Figure 3-6 below.

```
26..25 ..24..23..22..21..20..19..18..17..16..15..14..14..
13..12..11..10..9..8..7..6..5..4..3..
KN 230 Vx.x
08-00-2b-55-55-55
0x1000000
>>
```

Hexadecimal memory size (16 MB)

Figure 3-6: DECsystem 5100 Power-up Diagnostics Display

The amount of memory that is installed is displayed in hexadecimal format on the third data line. Table 3-1 below provides decimal equivalents for the hexadecimal memory sizes shown in the power-up diagnostics screen.

Memory Size	Hexadecimal Value	Memory Size	Hexadecimal Value
4 MB -----	0x400000	48 MB -----	0x3000000
8 MB -----	0x800000	56 MB -----	0x3800000
12 MB -----	0xC00000	64 MB -----	0x4000000
16 MB -----	0x1000000	72 MB -----	0x4800000
20 MB -----	0x1400000	80 MB -----	0x5000000
24 MB -----	0x1800000	96 MB -----	0x6000000
32 MB -----	0x2000000	104 MB -----	0x6800000
40 MB -----	0x2800000	128 MB -----	0x8000000

Table 3-1: Hexadecimal Values for DECsystem 5100 Configurations

When the power-up diagnostic test detects any unusable memory, it will display a fourth data line that indicates the amount of bad memory, as shown below in Figure 3-7.

```

26..25 ..24..23..22..21..20..19..18..17..16..15..14..
13..12..11..10..9..8..7..6..5..4..3..
KN 230 Vx.x
08-00-2b-55-55-55
0x1000000
bad mem: 0x1400
>>

```

Size of unusable memory (hexadecimal)

Figure 3-7: Power-Up Diagnostic Display with Bad Memory Detected

If a bad memory message is displayed, make a note of the value and proceed to run the functional memory test described in the next section (Section 3-5) to determine the location of the failing module.

Even if the power-up diagnostic test indicates that all the installed memory is functional, you may want to run the functional memory test as additional confirmation.

3.5 DECsystem 5100 Functional Memory Test

The following procedure can be used with the DECsystem 5100 system to check the functional condition of installed memory. The memory diagnostic test can be initiated any time after the power-up self-tests are complete and the cursor is flashing next to the >> prompt.

To run the memory diagnostic test, enter the following command:

```
conf -m
```

The command prompts the system to test the installed RAM and display the results on the screen. Below (Figure 3-8) is an example of the data to expect if a system has a pair of 16 MB modules installed in Bank 0, a pair of 16 MB modules installed in Bank 1, and a pair of 4 MB modules installed in Bank 2, for a system total of 72 MB.

```

memory: total size 72MBs
  bank 0   16MB SIMMS      size: 32MBs    0 bad pages
  bank 1   16MB SIMMS      size: 32MBs    0 bad pages
  bank 2    4MB SIMMS      size:  8MBs    0 bad pages

```

Figure 3-8: Example of Diagnostic Memory Test Results

The top line of Figure 3-8, on the previous page, shows how much installed RAM the CPU recognizes. The following lines in Figure 3-8 indicate the bank locations on the CPU, the individual density of each module in a bank, and the total memory amount for a bank; the last column indicates any portion of a bank that may be defective. Refer to Figure 3-4 on page 3-4 for the bank number arrangement of the memory array.

If the values displayed indicate a lack of complete memory recognition, do the following:

- Make note of the values shown.
- Repeat the installation procedures and precautions given earlier in this chapter and check that each module is seated correctly in its socket. An easy way to check this is to sight along the tops of the installed modules; all the tops should be at the same level. If one is higher than the rest, *do not push on it*. Remove it and then re-install it.
- Check the arrangement of the modules in their arrays. Refer to the module configuration restrictions given on page 3-4.
- Re-assemble and repower the system.
- Compare the current values of the power-up test with the previous values.
- If a problem is still evident, contact Clearpoint's Product Support for assistance (refer to Chapter 4).

Chapter 4 Problems?

4.1 Chapter Overview

In addition to Clearpoint's lifetime warranty, stated below, Clearpoint provides product support 24 hours/day, 7 days/week. If you encounter difficulty, before calling one of the support numbers listed on page 4-3, read the troubleshooting section on the next page. After following the suggested procedures, if the difficulty persists, call Clearpoint's Product Support Engineering for immediate telephone support.

Clearpoint's Lifetime Warranty Policy

Clearpoint warrants this memory product against defects in workmanship and materials for the life of the product. In the event of failure, Clearpoint will repair or replace (at our discretion) the defective memory product.

To obtain service under this warranty, you must call the Clearpoint Product Support Department and obtain a **Return Material Authorization** number.

You will then need to provide them with the Clearpoint product name, size, serial number, revision code and symptoms of the problem. You must then ship the defective material to Clearpoint in its **original** packaging with the RMA number written on the outside. Clearpoint will then either ship you a replacement board or repair the defective board.

Shipping and insurance charges from the customer to Clearpoint are to be paid by the customer. Shipping and insurance charges from Clearpoint to the customer are to be paid by Clearpoint.

NOTE:

These memory products can be damaged by Electrostatic Discharge (ESD). If they are not packaged in the original packaging designed to protect them from ESD, they may be damaged and the warranty may be voided.

THIS WARRANTY IS LIMITED AND DOES NOT APPLY TO CONDITIONS RESULTING FROM IMPROPER USE, IMPROPER INSTALLATION OR UNAUTHORIZED MODIFICATIONS TO THE MEMORY PRODUCTS.

4.2 Troubleshooting

If, after you install the DCME-576 modules, your system exhibits one of the symptoms listed below, one or more of the modules may be installed incorrectly:

- No image appears on the video monitor.
- The system fails or “hangs” during the power up memory test.
- The system will not recognize all of the memory installed.
- The system crashes while booting, or shortly thereafter.

Often the problems are due to one of two common installation errors; a module is not seated correctly, or the module configuration is not correct.

Note:

Before you check for either possibility, make certain that you take all the precautions described in Chapter 2 (VAXstation 3100) or Chapter 3 (DECsystem 5100) that relate to disconnecting power and to electrostatic discharge.

1. Check that each module is seated properly.

Even if the modules appear to be well seated, a small misalignment of one of the modules may cause the system to fail either continuously or intermittently. A quick way to check for proper seating is to look across the tops of the modules and make sure that all of the module tops are at the same level. Release and re-install any module that appears higher; *do not push down on a module while it is in a connector.*

If the problem continues, remove and re-install all the new modules, as well as any modules that were moved to a different connector. Refer to the module removal procedures described on page 2-4 (VAXstation 3100) or on page 3-4 (DECsystem 5100).

2. Check the memory configuration.

Refer to the guidelines given on page 2-4 (VAXstation 3100) or on page 3-4 (DECsystem 5100). Make certain that each of the installed modules conforms to the requirement of arranging modules according to size and that no empty connectors exist between consecutive modules.

If the problem continues after checking the possibilities listed above, call Clearpoint's Product Support for assistance.

4.3 Calling Product Support

Clearpoint provides its customers with 24-hour Product Support assistance.

In the United States, call toll free, 1-800-332-2578.

In Canada, call toll free, 1-800-243-2578.

In Europe, call The Netherlands, +31-206540250, during business hours.

International, call 1-508-435-7400.

FAX: 508-435-7504

Return of all product must be accompanied by a **Return Material Authorization** number. To obtain the RMA number, call Product Support with the following information:

1. Clearpoint part number and size: DCME-576/_____ MB
2. Serial number and revision: _____
3. Date of installation: _____
4. Type of system: _____
5. Model number: _____
6. Operating system and version: _____
7. Reason for the call (include any error messages): _____

8. Troubleshooting efforts: _____

9. Slot-by-slot configuration: _____

10. Ship-to address



About Clearpoint

Clearpoint was founded in 1982 with the goal to design cost-effective products with advanced technology and superior quality. Today, Clearpoint manufactures the broadest line of add-in memory, disk and tape storage subsystems, and innovative internetworking products.

The company has developed a unique workplace. Blending financial goals with human values, Clearpoint employees are committed to innovation, support, and service. At Clearpoint, you get the best products your money can buy.

